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August 28, 1990

Mr. Deane Zeller
District Manager
Salt Lake District
Bureau of Land Management
2370 South 2300 West
Salt Lake City, Utah 84119

RE: Comments on the latest draft of the USGS study plan for the Bonneville Salt Flats (BSF).

Dear Mr. Zeller:

The following are my comments on the second draft (8-7-90) of the USGS study plan for the BSF.

Page 2 - OBJECTIVES

In reference to salt removal mechanisms it states, "None can be quantified precisely..." The coalition committee must understand this. I would recommend that all estimates of quantities of salt removed have an accompanying statement describing the amount of error associated with the estimate.

STUDY ELEMENT 1, transport of salt by wind driven ponds.

Do these ponds remove salt from the BSF study area? The only exit available is on the northeast near Floating Island. This is also a potential area for inflow of surface ponds which develop from the north. This area should be watched to see if surface water is moving in or out of the study area. With this one exception, I see few reasons to track surface water ponds because the only outflow of the dissolved salts is to the brine collection ditches or through subsurface flow along the line of the interstate highway, both of these exits should be adequately covered by installation of metering devices and monitoring wells. From a modeling perspective the surface ponds appear to be unlikely major salt sources or sinks.

Perhaps the USGS has already done some sensitivity analysis on the geometry of the salt crust and how it effects the solute transport model. This is the only reason I can presently see to pursue this task with vigor. If a full blown solute transport model is not used in the study, perhaps some of the information from the pond transport element will appear as overkill.

see part 3
agenda

I do think the pond issue is worth studying but perhaps at a reduced scale. I would like to suggest a couple of alternative approaches to the question. First, consider using the Silver Island Mountains as a observation point for tracking pond movement. The range is surrounded by a dirt access road. The USGS has many "mountain goats" who could climb to one or more observation points and photograph the ponds, through time, from these same point(s). Would color-IR film help? Perhaps a contract photographer from Wendover could be used to avoid travel time and reduce costs. I realize that oblique photographs would compromise the mapping capabilities, but would this compromise be acceptable in a scaled down effort? In connection with the photography, the present USGS proposal involves using ground personnel to collect pond depth and chemistry. These ground personnel could also make notes on the pond location which may be enough location information to use the mountain-based photography for tracking the ponds.

Second, use the existing and new monitoring well network as staff gages to measure pond depth, perhaps some additional true staff gages would be needed to supplement coverage. Is it possible to install continuous stage measuring devices in a few locations? Third, consider reducing the ground visits which are specifically for pond observations, but make this part of any periodic sampling or monitoring of the piezometers/observation wells.

Fourth, in areas where past observations indicate that ponding usually occurs along the brine extraction ditches, install a few extra piezometers in the shallow-brine aquifer to better understand the relationship between the ponded water and its influence on the potentiometric surface and brine chemistry in the shallow aquifer.

On page 4, the last sentence of the first continuing paragraph states that Study Element 1 would enable the investigators to "determine the locations of any subsequent surface deposition of salt." from the evaporating ponds. Since the pond chemistry and associated salt phase changes will vary as the pond migrates, it seems unlikely that the study plan will provide enough information to successfully predict where solid phase salts will be deposited. For example, as ponds form and increase in dissolved salt concentration, they may be blown to a new location on or off the salt crust. As they move they infiltrate and evaporate. If concentration and temperature never cross into the solid phase for the salts, no solid phase salt will remain on the surface after the pond disappears by infiltration and evaporation. In order to accomplish the specific objective of determining the locations of any subsequent surface deposition of salt after pond formation, constant monitoring of the pond's location, temperature and chemistry would be needed.

In the early stage of the study, I would recommend a less aggressive and less costly approach to the problem. Perhaps more effort will be necessary down the road, but the justification for the level of effort presently proposed is not adequately explained in the present proposal. Unfortunately we were unable to discuss this part of the study during our last Technical Review Committee (TRC) meeting, but I would hope we can spend a little time on the topic at our next meeting.

STUDY ELEMENT 2 - transport of salt in solution via the shallow-brine aquifer.

This is the heart and sole of the study and in the terms given in the USGS proposal it seems sound and generally appropriate. I would like a future draft of the study element to be framed in a "flow chart" approach. Data collection and analysis should guide the study.

Future identification by the USGS of major tasks and decision points in the course of the study and related costs for alternatives would be helpful to the TRC. For example, the modeling of the project area has always been a part of the study plan, but the USGS assured the TRC in earlier meetings that early information may indicate that the modeling effort can be reduced or perhaps eliminated. Knowing when the study arrives at this point will help the committee by deferring a decision of the modeling specific aspects of the study plan at this time.

Pilot Valley Analog

This should remain as an analog for salt crust that is relatively unaffected by man-made stresses. In particular, the variations in the salt surface should be carefully studied and compared with the BSF.

Before the USGS completes another draft of the study plan the TRC should meet and attempt to prioritize tasks and questions which need to be answered by the USGS study. It would be helpful if the USGS could adjust the costs based on tasks which were eliminated at the last meeting and be prepared to discuss the issue of prioritization. It now appears funding is not as firm as in the past. The TRC will likely be faced with helping to prioritize work tasks for meeting the goals of the study.

My compliments to the USGS for their patience and understanding in dealing with the TRC. I think we are all working together to accomplish the objectives of the study in the least amount of time and in a cost effective manner. Thanks for the opportunity to comment.

Sincerely,

A handwritten signature in cursive script, appearing to read "Paul".

Paul B. Anderson
Consulting Geologist